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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/638,174	08/07/2003	Dale W. Schroeder	10004207-1	3783

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AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
P.O. Box 7599
Loveland, CO 80537-0599

EXAMINER	
STEIN, JAMES D	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 01/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/638,174	SCHROEDER, DALE W.	
	Examiner	Art Unit	
	James D. Stein	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0105*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-20 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by [USPUB 20020181843] to Vaganov.

With regard to claims 1, 7, and 16, Vaganov discloses a MEMS optical switch. Fig. 4 shows input optical fibers 12 for receiving beams of light and output optical fibers 26. Fig. 5 shows a first array of support devices 32 connected to said input optical fibers 12 for creating bends in said fibers. Also, a second array of support devices 36 is shown connected to said output optical fibers 26 for creating a bend in said output optical fibers 26. Furthermore, Vaganov teaches bends in said input and output optical fibers to direct the beams of light from the input optical fibers 12 to said output optical fibers 26: "At least a portion of the distal ends of the optical fibers move in three orthogonal and at least two angular dimensions to direct output beams from the plurality of transmitting devices to the plurality of receiving devices [0040]." It is noted to

applicant that "transmitting devices" comprises input optical fibers while "receiving devices" comprises output optical fibers. Fig. 5 clearly shows bends in the input 12 and output 26 optical fibers and said beams of light being directed from input optical fibers 12 to output optical fibers 26. Furthermore, the method of directing a beam of light regarding claim 16 is inherent to this disclosure.

With regard to claims 2, and15 in addition to the rejection of claim 1 previously discussed above, Fig. 2 shows a mirror 16 for receiving the beam of light from input optical fiber 12 and reflecting the beam to the output optical fiber 26.

With regard to claims 3, 8 and 17, in addition to the rejection of claim 1 previously discussed above, Figs. 21 A and B show an actuator device which is associated with each of the plurality of optical fibers 12, each mounted on array of support devices 32 used to create various directional bends in optical fibers 60. Among other detail, the teaching in paragraph [0140] indicates that a voltage applied on electrodes 174 and 176 will generate a force and cause a first actuator 190 to bend fiber toward the +Y direction. It is also taught that a voltage applied on electrodes 180 and 182 will generate a force and cause a second actuator 194 to bend the fiber in the -Y direction. Therefore, one can infer that a voltage applied on electrodes 177 and 178 will generate a force and cause actuator 192 to bend the fiber in the +X direction. This teaching anticipates applicants claim because first actuator 190 in a first pair of actuators 190 and 192 causes a force along an axis (+Y) to bend the input fiber 60, which is perpendicular to axis (+X) along which a force is generated by said second actuator 192 in first pair of actuators 190 and 192 to create a bend in the input optical fiber.

Furthermore, the method of directing a beam of light regarding claim 17 is inherent to this disclosure.

With regard to claims 4, 9 and 18, in addition to the rejection of claim 3 discussed above, Fig. 3 shows identical structure for both first 32 and second 36 array of support devices (same construction for input and output devices). Furthermore, Vaganov teaches, "FIG. 3 illustrates one embodiment of an optical switch 30 of the present invention. The FIG. 3 embodiment includes five major components, a transmitting unit, hereafter a "transmitting array" 32, an optical transparent media 34, a receiving unit, hereafter a "receiving array" 36, a control system 38 and a packaging 40. Transmitting and receiving arrays 32 and 36 each include an optical body 42, a fiber connector 44, a cavity 46, a lens 48, a focusing device 50 and a transmitting directing device 54 [0080]." Therefore it is inherent that Figs. 21 A and B also show an actuator device which is associated which is associated with each of the plurality of optical fibers 26, each mounted on said second array of support devices 36 used to create various directional bends in optical fibers 60. Among other detail, the teaching in paragraph [0140] indicates that a voltage applied on electrodes 186 and 184 will generate a force and cause a third actuator 196 to bend fiber toward the -X direction, and that a voltage applied on electrodes 182 and 180 will generate a force and cause a fourth actuator 194 to bend the fiber in the -Y direction. This teaching anticipates applicants claim because said third actuator 196 in a said second pair of actuators 196 and 194 causes a force along an axis (-X) to bend the output optical fiber, which is perpendicular to an axis (-Y) along which a force is generated by said second actuator 194 in first pair of actuators

196 and 194 to bend the output optical fiber. Furthermore, the method of directing a beam of light regarding claim 18 is inherent to this disclosure.

With regard to claims 5 and 13, in addition to the rejection of claim 3 previously discussed above, Figs. 12A and 12B show first array of support devices 32 to further comprise first support plate 156 connected to optical fiber 12 via connector 62. This construction is repeated for each of the optical fibers 12 in said array 32. Fig. 12b shows device in actuated position with said first support plate 156 in forced in rotated position by said first pair of actuators so as to impart bending 60 to input optical fiber 12. More specifically, " Actuators 76, 77, and electrodes 157 and 159 are formed in base member 32. This actuator design allows changing angular position of movable part 156 and 158. Actuators 76, 77, and electrodes 157 and 159 allow the application of force to movable parts 156 and 158 and resulting in a change in their position [0111]."

With regard to claims 6 and 14, the construction of said first array 32 and second array 36 of support devices are taught to be identical as previously discussed above. In addition to the rejection of claim 4 above, Figs. 12A and 12B show second support device 36 to further comprise a second support plate 158 connected to optical fiber 12 via connector 62. Fig. 12b shows device in actuated position with said second support plate 158 in forced in rotated position by said second pair of actuators so as to impart bending 60 to input optical fiber 12. More specifically, "Actuators 76, 77, and electrodes 157 and 159 are formed in base member 32. This actuator design allows changing angular position of movable part 156 and 158. Actuators 76, 77, and electrodes 157

and 159 allow the application of force to movable parts 156 and 158 and resulting in a change in their position [0111]."

With regard to claim 10, in addition to the rejection of claim 9 previously discussed above, Fig. 21A shows a first plurality of bands (174-186) of material surrounding the input optical fibers 12 (Fig. 3). This structure is associated with each of the input optical fibers 12 within said first array of support devices 32. This feature is illustrated clearly by the side cross-sectional view of Fig. 21B.

As discussed above, since the construction is identical for both input 32 and output 36 arrays, Fig. 21A also implies a *second* plurality of bands (174-186) of material surrounding the input optical fibers 26 (Fig. 3). This structure is associated with each of the input optical fibers 26 within said second array of support devices 36. This feature is illustrated clearly by the side cross-sectional view of Fig. 21B.

With regard to claim 11, in addition to the rejection of claim 10 discussed above, as discussed above, a voltage applied between bands 174 and 176, and bands 177 and 178 create a force between said bands and said first pair of actuators 190 and 192 so as to cause impart a bend in said input fibers 12. Vaganov teaches the force between electrode bands and actuators to cause fiber bending: "When a voltage is applied to plates 174 or 178 the electrostatic force attracts corresponding parts of moveable member 172. This results in a change of the angle or position of fiber 60 and beam 196 to create the required tilt or angle of the outgoing light beam [0137]." This disclosure anticipates the applicant's claim.

With regard to claim 12, since the construction is identical for both input 32 and output 36 arrays, the discussion above regarding claim 11 implies that a voltage applied between bands 180 and 182, and bands 184 and 186 create a force between said bands and said second pair of actuators 194 and 196 so as to cause impart a bend in said output fibers 12. Vaganov teaches the force between electrode bands and actuators to cause fiber bending: "When a voltage is applied to plates 174 or 178 the electrostatic force attracts corresponding parts of moveable member 172. This results in a change of the angle or position of fiber 60 and beam 196 to create the required tilt or angle of the outgoing light beam [0137]." This disclosure anticipates applicants claim.

With regard to claim 19, the method of directing a beam of light is inherent to the disclosed apparatus described above in the rejections of claims 10-12. For clarity, it is noted to applicant that the "first pair of actuators" and "second pair of actuators" of claims 11 and 12, comprise the "first and second actuators" and "third and fourth actuators" of claim 19, respectively.

With regard to claim 20, the method of directing a beam of light is inherent to the disclosed apparatus described above in the rejections of claims 5 and 6. For clarity, it is noted to applicant that the "first pair of actuators" and "second pair of actuators" of claims 5 and 6, comprise the "first and second actuators" and "third and fourth actuators" of claim 20, respectively.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. [USPUB 20030210854] to Tu, [USPUB 200100179556] to Goodman et al, and [USPAT 6,445,844] to Neukermans et al which describe related optical switch arrays with actuated flexing of fiber ends.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James D. Stein whose telephone number is (571) 272-2132. The examiner can normally be reached on M-F (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James D. Stein

John D. Lee
Primary Examiner